

## **Jadavpur University report**

### **IEE FOR DISCHARGE OF DRY WEATHER FLOW (DWF) TO EAST KOLKATA WETLANDS (EKW)**

#### **EXECUTIVE SUMMARY**

The study was organized in two parts. In the first part sampling and laboratory analysis of wastewater (in respect of selected chemical and biochemical parameters) from DWF channel and three sewage fed fish ponds at different points were carried out in June-July, 2006. Bottom sediments from DWF and selected fisheries and different parts of fishes from fish ponds were also sampled and analyzed for certain critical pollutants. The sewage analysis results of DWF indicate that the BOD values of sewage show a reduction from about 150 mg/l at Topsia Point A to about 30 mg/l at Ghusighata. All other critical parameters like TSS, COD, TDS, etc show similar declining trend. The COD values at Ghusighata are 80 mg/l or below, the initial COD at Topsia Point A being in the range of 300 to 400 mg/l. The TSS values show a declining trend from the initial values of more than 300 mg/l to around 100 mg/l near the final discharge point although a slight increase in TSS value is detected at Ghusighata due to ingress of tide water from Kulti river into the DWF channel through leaking control gates.

The results of analysis of water in the sewage-fed fisheries circuit clearly shows that the concentrations of BOD, COD and TSS significantly decline from the feeder channel through the pond systems to final outlet. For example, BOD of feeder channel is generally around 70-80 mg/l which reduces to in the range of 5-30 mg/l in the final outlet of the fisheries. Concentrations of heavy metal pollutants in the water of DWF and fisheries are generally on the low side. The peak values are 0.2 mg/l for Zn, 0.13 mg/l for Cr, 0.095 mg/l for Pb and 0.009 mg/l for Cd in DWF and fisheries water. Concentrations of such pollutants in fish liver and gill are comparatively high than in flesh. Amongst these pollutants, Zn and Cr are persistently present in all samples. Sediment samples show high concentrations of metal pollutants like Zn, Cr, Pb and Cd from DWF channel compared to those from the fisheries.

In the second part, Artificial Neural Network (ANN) modeling was carried out using Neurodimension for Excel software. The flow and the pollution load data was fed to the model to find an optimized output and predicted data for given inputs.

In the model, existing flow in DWF was considered as 800 MLD and prediction was made by using the model analysis of 900 MLD and 1000 MLD in the DWF. The model prediction indicates that the depth of water in the 3 studied fisheries could be raised between 76.2 mm to 101.6 mm for increased sewage flow 14.8% to 18.26% over and above. The present flow of the DWF is 800 MLD. If the flow in DWF is increased to 900 MLD then the depth of pond water could be further increased for utilization of sewage in fish pond between 20.79% to 42.68%. When the flow of sewage in DWF is increased to 1000 MLD, further increase in depth in fish pond will be between 58.51 mm and 69.34 mm resulting in increased sewage feeding in fish ponds between 38.1% to 88.9%. The prediction on BOD distribution from Topsia Point A to Ghushighata including these loops indicates that the BOD at the discharge point for three different flows (800, 900 & 1000 MLD) is around 30 mg/l.